

CHAPTER 4. PHYSICAL RESOURCES AND VEGETATION MANAGEMENT

4.1 Integrated Training Area Management (ITAM)

As the Department of Defense's (DOD) primary land force, the Army relies on land to achieve its training and testing objectives and maintain force readiness. Force readiness depends on high quality, realistic training. The use of these lands for training and testing purposes, of course, causes damage that can potentially reduce the quality of training on these lands. It is in overcoming the apparent conflict between maintaining force readiness and land stewardship that ITAM serves the overall needs of the Army.



Healthy ecosystems provide quality training opportunities.

There are four components of the ITAM program. These four components work in unison to accomplish the ITAM mission:

- Land Condition Trend Analysis (LCTA)
- Training Requirements Integration (TRI)

- Land Rehabilitation and Maintenance (LRAM)
- Environmental Awareness (EA)

4.1.1 ITAM Goals

ITAM is a key part of the Army's commitment to environmental stewardship. The Chief of Staff of the Army has four broad goals that serve as the foundation for official ITAM policy. ITAM goals all contribute to one or more of the overall natural resources program goals of land stewardship, military training support, compliance, quality of life, and program integration. The four broad ITAM goals are:

- Integrate environmental planning procedures into all operations.
- Protect natural and cultural resources.
- Ensure operations comply with environmental standards and receive no notices of violation or fines for noncompliance.
- Prevent future pollution and reduce hazardous waste and toxic releases.

The ITAM program is the Army's formal strategy for focusing on sustained use of training and testing lands. The intent of the ITAM program is to provide a uniform training land management protocol for the total Army. Under the ITAM program the Army will manage its lands in a sound manner to ensure no net loss of training capabilities.

ITAM establishes a systematic framework for decision-making and management of Army training lands. It integrates elements of operational, environmental, master planning, and other land-based

programs that identify and assess land use alternatives. The ITAM program also supports sound natural and cultural resources management practices and stewardship of land assets, while sustaining those assets to support training, testing, and other installation missions.

The specific goals of the Army's ITAM program are:

- Achieve optimal sustained use of lands for realistic training by providing a protocol that balances usage, condition, and level of maintenance.
- Implement a management and decision-making process that integrates Army training and other mission requirements for land use with sound natural and cultural resources management.
- Advocate proactive conservation and land management practices.
- Align Army training land management priorities with Army training, testing, and readiness priorities.

The steps used to meet the ITAM program goals are:

- Sustain Army training and testing through diagnostic methods, models, and tools.
- Support assignment of the optimum type, frequency, duration and intensity of training and testing that can be conducted on a given parcel of land.
- Identify the risks and costs associated with exceeding the capacity of the land to support training.
- Allocate training land uses, including the type, frequency, duration and intensity of use, based on the capacity of the land to sustain those uses.
- Support sustained use of land by planning, programming, and executing repair and maintenance projects, and by reconfiguring and redesigning training and testing areas to meet recognized requirements.

- Educate users to prevent avoidable damage to the land and minimize unavoidable damage resulting from training, testing, and other mission activities.
- Establish a defined land condition baseline for natural resources that will be maintained through ITAM, and is relevant to the installation environmental setting and mission activity.
- Monitor land and natural resources conditions and determine trends in those conditions.
- Stabilize and sustain natural and cultural resources conditions by changing type, frequency, duration, or intensity of land use, or by adjusting levels of repair and maintenance.
- Increase understanding of Army mission training requirements by educating environmental and natural resources personnel.

4.1.2 ITAM Planning – Training Requirements Integration (TRI)

Description and Justification: TRI is a decision support procedure that integrates all requirements for land use with natural and cultural resources management processes. TRI integrates the installation training and testing requirements for land use derived from the Range and Training Land Program (RTLTP), the range operations and training land management processes, and the installation training readiness requirements with the installation's natural resources conditions. The Army Training and Testing Area Carrying Capacity (ATTACC) program is the standard ITAM methodology for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices. The integration of all requirements occurs through continuous consultation among staff members from the Directorate of Plans, Training, and Mobilization (DPTM), natural and cultural resources managers, and other environmental staff. The output of the TRI process is incorporated in the installation's Integrated Natural Resources Management Plan (INRMP).

Measures of Effectiveness:

- Ensure sustained accessibility to adequate training lands to support training to standards under realistic natural conditions.
- Provide military trainers and land managers with the necessary technical and analytical information to make good decisions.
- Integrate doctrine-based training and testing with land constraints.
- Quantify training land carrying capacity.
- Reduce or eliminate the number of Notices of Violations (NOVs) resulting from military maneuver training.

Management History: TRI was first implemented at Fort Richardson in 1995. ITAM and natural resource personnel regularly interact with Range Control at Fort Richardson, ensuring effective integration of natural resource and military requirements.

Current Management: TRI supports USARAK's requirements for ecologically sustainable training lands. TRI improves coordination, and facilitates cooperation and decision-making by proactively providing a wide variety of natural resources information, including land condition to military trainers. The TRI goals are achieved when training, testing, and environmental requirements are balanced in the decision-making process. USARAK

currently conducts TRI on Fort Richardson annually. TRI is currently approved and funded through 2002. Unless this INRMP is approved and funded, TRI will cease in 2003.

Proposed Management: Continue and further develop the TRI program as outlined in Table 4-1.

Other Management Alternatives Considered and Eliminated: There are other potential methods of managing training lands and scheduling smarter to minimize disturbance. Other methods, however, were considered either inadequate or cost prohibitive.

4.1.3 ITAM Monitoring (Land Condition Trend Analysis)

Description and Justification: Land Condition Trend Analysis (LCTA) is the component of the ITAM program that provides for the collecting, inventorying, monitoring, managing, and analyzing of tabular and spatial data concerning land conditions on an installation. LCTA provides data needed to evaluate the capability of training lands to meet multiple-use demands on a sustainable basis. It utilizes relational databases and GIS to support land use planning decision processes. LCTA collects physical and biological resources data to relate land conditions to training and testing activities. These data are intended to provide information to effectively manage land use and natural resources.

Table 4-1. Training Requirements Integration Program.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Integrate training and testing requirements with training land management into a prioritized ITAM work plan, and execute requirements subject to availability of resources.	USARAK ITAM	Medium	x	x	x	x	x
Optimize training land management decisions by coordinating mission requirements and land maintenance activities with training and testing land carrying capacity.	USARAK ITAM	Medium	x	x	x	x	x
Identify existing and projected training land resources and prioritized land use requirements.	USARAK ITAM	Medium	x	x	x	x	x
Generate prioritized requirements for land rehabilitation, repair, and/or reconfiguration.	USARAK ITAM	Medium	x	x	x	x	x

Measures of Effectiveness:

- Determine the condition of the land and its ability to support military training.
- Identify and recommend land rehabilitation and maintenance priorities.
- Identify areas degraded due to erosion and recommend erosion control repair priorities.
- Identify wetlands disturbance and recommend restoration priorities.
- Provide information that may affect force structure and stationing decisions at MACOM and DA levels.

Management Areas: LCTA maps land use on Fort Richardson. There are three general land uses on Fort Richardson that can be described as (1) urban areas, (2) impact areas, and (3) training areas. Training areas are further delineated into primary land uses, such as maneuver areas, bivouac areas, foot use, firing points, firing ranges etc., and secondary land uses, such as gravel pits, recreation areas, campgrounds, wildlife habitat cuts etc. The primary land use categories and LCTA sampling protocol for each are shown in Table 4.2.

Management History: LCTA was initiated on Fort Richardson in 1994 with 109 core plots allocated. Core plots were allocated using a GIS and a stratified random sampling design according to aggregated soils and vegetation data (derived from satellite imagery). LCTA plots were well distributed on Fort Richardson with the exception of artillery impact areas. Ninety-four plots were inventoried that year and the remaining core plots were inventoried in 1995. All core plots were inventoried again in

1996, using standard LCTA methods. Results from the first three years indicated no significant short-term trends.

Core plots are designed to be monitored intensively on a long-term basis. Frequency of intensive monitoring is dependent upon management objectives and the amount of landscape change occurring on the post. Plots will be monitored using the standard methodology once every 5 to 10 years.

Alaska Region LCTA was developed in 1996 and 1997 and was implemented on Fort Richardson in 1997. This methodology was designed to determine the land condition status of individual training areas and land use areas (a finer spatial scale than the standard LCTA methods). This was done to provide more useful information for managing land uses on Fort Richardson, as the standard LCTA methods did not provide sufficient detail at finer spatial scales. LCTA plots have been monitored annually during 1997-2001 using these modified methods.

Current Management: USARAK currently conducts LCTA monitoring on approximately one-third of Fort Richardson every year. LCTA is currently approved and funded through 2002. Unless this INRMP is approved and funded, LCTA monitoring will cease in 2003.

Proposed Management: Continue the LCTA program as outlined in Table 4-3.

Other Management Alternatives Considered and Eliminated: There are many other potential methods of monitoring training lands to determine land condition. The Alaska Region LCTA methods, however, were developed specifically for Alaskan

Table 4-2. LCTA Monitoring Areas.

LCTA Monitoring Areas	Monitoring Intensity	Monitoring Frequency	Minimum Number of Sampling Points	Size
Maneuver Areas	High	Once every 3 years	25 per year	7,325 acres
Bivouac Areas	High	Once every 3 years	25 per year	13,672 acres
Foot Use Areas	Low	Once every 3 years	60 per year	43,265 acres
Drop Zones	Medium	Once every 3 years	25 per year	450 acres
Firing Ranges	Medium	Once every 3 years	25 per year	378 acres
Firing Points	High	Once every 3 years	25 per year	49 acres
Excavations	Low	Once every 3 years	25 per year	37 acres

Table 4-3. Land Condition Trend Analysis Program.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Conduct annual LCTA monitoring on Fort Richardson.	USARAK ITAM	Medium	x	x	x	x	x
Conduct annual LCTA data analysis and management during 2002-2006.	USARAK ITAM	Medium	x	x	x	x	x
Prepare annual LCTA report during 2002-2006.	USARAK ITAM	Medium	x	x	x	x	x

ecosystems, and with the stated purpose of assessing land condition in terms of its usefulness for optimizing military training load, minimizing impacts, and pinpointing needed land restoration activities. Other methods could be developed that include collecting data at more locations per year, but these would be cost prohibitive.

4.1.4 Land Rehabilitation and Maintenance (LRAM)

Description and Justification: LRAM is a preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements. LRAM uses erosion control techniques and revegetation to maintain soils and vegetation required to support the military mission.

These specifically designed efforts help installations maintain quality military training lands and minimize long-term costs associated with land rehabilitation or additional land purchases. LRAM includes programming, planning, designing, and executing land rehabilitation, maintenance, and reconfiguration projects based on requirements and priorities identified in the TRI and LCTA components of ITAM.

Measures of Effectiveness:

- Sustain long-term training and testing on lands held under the stewardship of the U.S. Army.

- Sustain the overall condition of installation lands to ensure long-term military viability of its installations.
- Increase mobility, access, and availability within and between training areas.

Management Areas: Management areas for LRAM and erosion control (see Section 4.2.4.2) are the same. At Fort Richardson, a rotational system of erosion control and LRAM will be used. On the North Post, erosion control and LRAM repairs will be focused on repair in Training Areas 1 and 2 in 2002, Training Areas 3 and 4 in 2003, Training Areas 5 and 6 in 2004, Training Areas 7 and 8 during 2005, and Training Areas 9 and 10 during 2006. Erosion control and LRAM repair will be conducted as needed on the South Post (see Figure 4-1).

Management History: There have been a number of LRAM projects completed since 1994 on Fort Richardson. In 1994 the Grezelka Range was revegetated. The McLaughlin Range Trench Complex access was improved in 1997. Grezelka Range was again revegetated in 1999 and berm repairs were made. The Malamute Drop Zone expansion area was reshaped and revegetated in 1998. The Malamute Drop Zone bivouac area was hardened in 1999 and the Training Area 9B bivouac area was hardened in 2000.

Current Management: USARAK attempts to repair approximately ten percent of degraded sites on Fort Richardson every year, as well as improving sites for military use. LRAM projects include repairing degraded land, improving access into training areas, hardening bivouac areas, and repairing ranges. Ongoing projects include those projects

funded late in 2001 but not projected to be completed until 2002. If this INRMP is not approved and funded, LRAM projects will cease after 2002.

Proposed Management: USARAK proposes to implement a Training Area Recovery Plan (TARP) program, a rotational system of rest, rehabilitation, and erosion control as part of the proposed action. Each training area on Fort Richardson will be taken out of rotation and placed off limits to military and recreational vehicle once every ten years for a period of two years. Maintenance actions for erosion control, LRAM, range maintenance, and roads and grounds maintenance will be scheduled during the first year each training area is scheduled for rest and repair, although emergency actions to repair damage must take place any time, any place. Pro-

posed actions for 2002 - 2006 are shown in Table 4-4.

Other Management Alternatives Considered and Eliminated: There are many other potential sites for repair and maintenance on Fort Richardson. However, less than ten percent of the total number of sites that are degraded can be fixed per year because of cost limitations. Repairing fewer than the number of site listed above can lead to poor water quality and may limit military training opportunities.

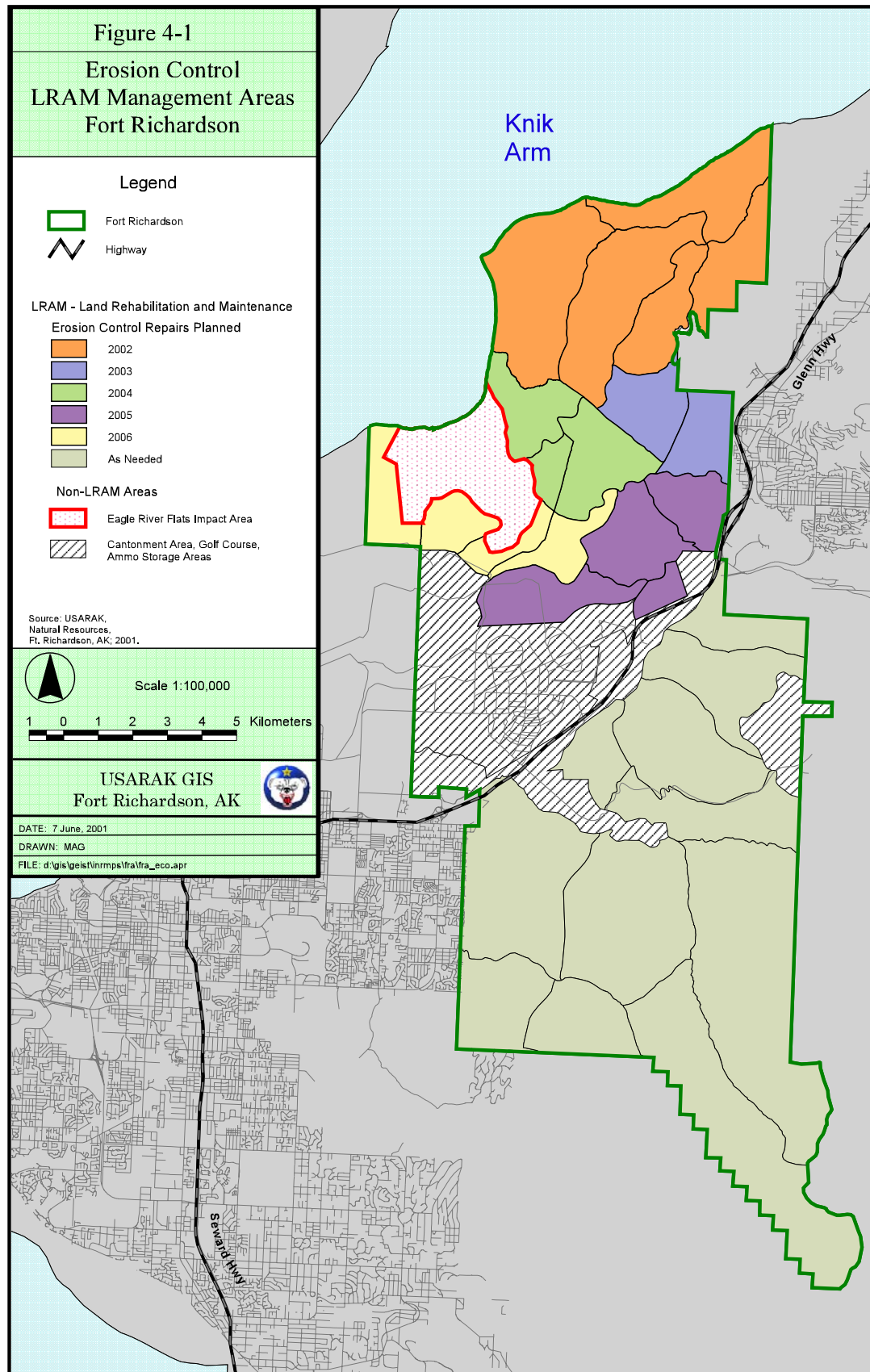
4.1.5. Environmental Awareness (EA)

Description and Justification: EA is the component of the ITAM program that seeks to foster

Table 4-4. Land Rehabilitation and Maintenance.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Implement Training Area Recovery Plan (TARP) Program.	USARAK DPTSM / Conservation	High	x	x	x	x	x
Harden Firing Point 1 Bivouac.	USARAK ITAM	Medium	x				
Harden Malamute Assembly Area.	USARAK ITAM	Medium	x				
Improve access and maneuverability in Engineer Expressway Maneuver Corridor.	USARAK ITAM	Medium	x				
Repair and revegetate berms on Newton Range.	USARAK ITAM	Medium		x			
Harden Upper and Lower Fox Mortar Point.	USARAK ITAM	Medium		x			
Harden Perry Mortar Point.	USARAK ITAM	Medium			x		
Harden Firing Points 5, 3 and 23.	USARAK ITAM	Medium			x		
Harden Clunie bivouac site.	USARAK ITAM	Medium			x		
Improve access and maneuverability in Connors-Beach Lake Maneuver Corridor.	USARAK ITAM	Medium				x	
Improve access and maneuverability in the trail to Malamute Drop Zone.	USARAK ITAM	Medium				x	
Improve access and maneuverability in Bulldog Trail Maneuver Corridor.	USARAK ITAM	Medium				x	
Improve access and maneuverability in Bars Blvd. Maneuver Corridor.	USARAK ITAM	Medium				x	
Improve access and maneuverability in Route Sweat Maneuver Corridor.	USARAK ITAM	Medium					x
Improve access and maneuverability in Waldon Lake Maneuver Corridor.	USARAK ITAM	Medium					x
Improve access and maneuverability in Thompson Lake Maneuver Corridor.	USARAK ITAM	Medium					x
Improve access and maneuverability in Fire Tower Ridge Maneuver Corridor.	USARAK ITAM	Medium					x

Figure 4-1. Erosion Control/LRAM Management Areas.



a conservation ethic in military personnel. EA consists of the following three elements: training/education materials, an implementation plan for awareness training, and a command emphasis. EA consists of the development of an instructional videotape, soldier handbooks, soldier field cards, and posters focused on maneuver damage prevention. The videotape, which is shown to all soldiers during in-processing and at Range Control safety briefings, focuses on prevention of maneuver damage. The soldier handbook includes a summary of restrictions on training used to preserve the quality of training lands, as well as a map showing areas with special environmental considerations. The educational materials produced by the EA program describe the principles of land stewardship and the practices of reducing training and/or testing impacts. EA materials also include information geared towards environmental professionals concerning the operational requirements for Army training.

The Sikes Act requires “no net loss” in the capability of military lands to support the military mission. EA supports this compliance goal by reducing maneuver damage, reducing long-term maintenance costs for repair of training lands, and improving operational security skills. When land users practice environmental stewardship in the field, they are also achieving Army mission objectives. The EA program provides the land users with an understanding of how mission, training, testing, and other activities impact the land’s capacity for sustaining a realistic training environment. EA also educates land users on how their land use affects the resident wildlife and vegetation.

Measures of Effectiveness:

- No net loss in the capability of Fort Richardson to support the military mission.
- Decrease or eliminate the number of Notices of Violation and fines as a result of military training.
- Minimize the amount of maneuver damage.
- Educate land users of their environmental stewardship responsibilities.

- Conduct operational awareness for environmental professionals.
- Brief at least 60 soldiers in at least two pre-command briefings per year during 2002-2006.
- Pass out a minimum of 500 handbooks and 1000 field cards per year during 2002-2006.
- Brief a minimum of 1,000 soldiers in range safety briefings and pre-exercise briefings per year.

Management History: Fort Richardson’s EA program was initiated in 1995 and was fully implemented by 1997.

Current Management: USARAK actively works to educate soldiers to minimize damage and reduce waste, both in the cantonment area and in the training areas. USARAK presents EA materials during range safety meetings, pre-command courses, and pre-exercise classes. At these classes, current EA materials, such as field cards and handbooks, are passed out. In addition, each soldier is required to have either a handbook or a field card with them during major field exercises. These actions will continue throughout 2002-2006. However, if this INRMP is not approved and funded, no new materials will be developed and reproduced.

Proposed Management: Continue and further develop the EA program as outlined in Table 4-5.

Other Management Alternatives Considered and Eliminated: There are many potential options for educating soldiers on how to reduce damage while working in the training areas. The current EA materials, however, have been developed to be effective to reach the appropriate audience. A lower level of effort could lead to greater environmental damage and possible fines for non-compliance. A greater level of effort would be cost prohibitive.

4.1.6 ITAM Responsibilities

4.1.6.1 Department of the Army

The Office of the Deputy Chief of Staff, Operations and Plans (ODCSOPs), Headquarters, Department of the Army, is the functional proponent and as such, exercises overall supervision for the

Table 4-5. Environmental Awareness.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Brief EA during range safety briefings, pre-command course classes, and pre-exercise briefings.	USARAK ITAM	Medium	x	x	x	x	x
Distribute up-to-date EA handbooks and soldier cards.	USARAK ITAM	Medium	x	x	x	x	x
Update EA handbook and field cards in 2003.	USARAK ITAM	Medium		x			
Update EA video in 2004.	USARAK ITAM	Medium			x		
Develop ITAM web page for USARAK by 2003.	USARAK ITAM	Medium		x			

ITAM program. The Directorate of Training issues policy, allocates resources, and oversees execution of ITAM.

The Office of the Assistant Chief of Staff for Installation Management, Directorate of Environmental Programs, provides conservation policy in support of the ITAM program. The Office of the Directorate of Environmental Programs issues policy, allocates resources, and oversees execution of ITAM. In addition, The Directorate of Environmental Programs works with ODCSOPs to ensure that the Army's ITAM and Conservation programs are mutually supporting and integrated.

The United States Army Environmental Center (USAEC) provides environmental technical support to HQDA, MACOMs, and installations, based on approved and resourced ITAM User Requirements.

The United States Army Training Support Center is the executive agent for the ITAM program. The Directorate of Combat Training Support integrates ITAM with other Army training systems and programs, provides support to MACOMs and installations for the TRI component of ITAM, develops and submits an annual ITAM work plan describing executive agent needs, organizes and hosts semi-annual Program Management Reviews, and participates on the Executive Management Council and Council of Colonels.

4.1.6.2 U.S. Army Pacific (USARPAC)

USARPAC develops, provides, and integrates ITAM policy to USARAK; provides management

oversight; and represents USARAK's needs to executive ITAM program management organizations.

4.1.6.3 U.S. Army Alaska

The ITAM program links the efforts of the Directorate of Plans, Training, Security, and Mobilization (DPTSM), who has responsibility for installation training land management, with the efforts of the Directorate of Public Works (DPW) and the natural and cultural resources/environmental staffs to support the overall objectives of sustaining a well-trained and equipped combat force.

Directorate of Plans, Training, Security, and Mobilization: DPTSM establishes ITAM program priorities and policies and manages the overall ITAM program in USARAK. DPTSM oversees ITAM funding provided to USARAK, submits an annual work plan reflecting ITAM requirements, provides user requirements input to USARPAC, submits technical support requests, and submits execution reports. DPTSM also provides training and other mission land use data to the environmental management staff.

Directorate of Public Works: Executing the USARAK ITAM program (according to DPTSM priorities and policies) is the responsibility of the DPW. DPW coordinates all ITAM-related maintenance, repair, and facility management work and prepares and submits an annual work plan reflecting ITAM requirements to DPTSM.

4.2 Watershed Management

4.2.1 Watershed Management Goals

Watershed management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and program integration. AR 200-1 establishes the following goals for water resources on Army lands:

- Conserve all water resources.
- Control or eliminate sources of pollution to surface or groundwater through conventional or innovative treatment systems.
- Demonstrate leadership in attaining the national goal of zero discharge of water pollutants.
- Provide drinking water that meets applicable standards.
- Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.
- Consider non-point source pollution abatement in all construction, installation operations, and land management plans and activities.

Attainment of most of the goals above is not the responsibility of Army natural resources program (they fall under the auspices of the Army environmental compliance and restoration program), but some of them, especially the first and last two, are clearly natural resources management concerns. To date erosion has not been identified as a significant threat to water quality on Fort Richardson, but munitions explosions and associated wildfires cause soil disturbance, which increases the risk of significant erosion.

4.2.2 Watershed Management Planning

Watershed program management and planning includes all the planning, budgeting, contract over-

sight, and organization necessary to implement the watershed management program. The primary emphasis for this component of the watershed management program is to prepare and update the soil resources management action plan and the soil and water quality monitoring protocol.

4.2.2.1 Soil Resources Management Plan

Description and Justification: Prepare, update, and implement a soil resources management action plan for Fort Richardson. The soil resources management plan will contain information on the location, extent, and severity of erosion sites, as well as detailed descriptions of the work needed to repair the sites. This plan is required to correct active erosion sites near sensitive areas such as streams and wetlands. This plan is required to stay in compliance with the Clean Water Act and the Sikes Act which requires “no net loss” in the capacity of lands to support the military mission. Updates of the soil resources management action plan are required by Public Law 86-797 (Sikes Act) every five years to implement the INRMP. Per Memorandum DAIM-ED-N, 21 March 1997, this component of the INRMP is a class 1 requirement.

Measures of Effectiveness:

- Complete, update, and maintain the soil resources management action plan.
- Effectively protect soils while allowing military use of the land.
- Involve the resource agencies the planning process, and the public in review of the soil resources management action plan.

Management History: The first soil resources management plan was completed in 2001 by Gene Stout and Associates. Earlier evaluation and planning for erosion control projects was completed in 1998 and 1999 by the Alaska DNR Plant Materials Center and the Palmer Soil and Water Conservation District.

Current Management: Current management actions to update the soil resources management plan will cease in 2002. If this INRMP is not approved and funded, no new soil resources management plan will be prepared, updated, or implemented.

Table 4-6. Soil Resources Management Plan.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Prepare annual updates of the soil resources management plan.	USARAK Natural Resources	High	x	x	x	x	x
Prepare and update soil resources management action plan for the planning period of 2007-2011.	USARAK Natural Resources	High					x
Complete NEPA documentation for update.	USARAK Natural Resources	High					x

Policies already in place in the current soil resources management plan will continue.

Proposed Management: Prepare and implement a soil resources management plan as outlined in Table 4-6.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current soil resources management plan with updates at least every five years. NEPA documentation is also legally mandated.

4.2.2.2 Soil and Water Quality Management Plan

Description and Justification: Prepare, update, and implement a soil and water quality action plan for Fort Richardson. The soil and water quality management action plan will guide management actions for maintaining and improving soil and water quality as a result of UXO and other potential contaminants. This plan is required to stay in compliance with the Safe Drinking Water Act, the Clean Water Act and the Sikes Act which requires “no net loss” in the capability to support the military mission. Updates of the soil and water quality management plan are required by Public Law 86-797 (Sikes Act) every five years to implement the INRMP. Per Memorandum DAIM-ED-N, 21 March 1997, this component of the INRMP is a class 1 requirement.

Measures of Effectiveness:

- Complete, update, and maintain the soil and water quality management action plan.
- Effectively protect water quality while allowing military use of the land.

- Involve the resource agencies the planning process, and the public in review of the soil and water quality management plan.

Management History: The first soil and water quality management plan was completed in 2001.

Current Management: Current management actions to update the soil and water quality management plan will cease in 2002. If this INRMP is not approved and funded, no new soil and water quality management plan will be prepared, updated, or implemented. Policies already in place in the current soil and water quality management plan will continue.

Proposed Management: Prepare and implement a soil and water quality management plan as outlined in Table 4-7.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current soil and water quality management plan with updates at least every five years. NEPA documentation is also legally mandated.

4.2.3 Watershed Inventory and Monitoring

Watershed inventory and monitoring entails both planning-level surveys and annual monitoring. Soil and surface water planning-level surveys identified the types and locations of soils and surface waters on Fort Richardson. LCTA monitoring identifies degradation to soils by human-caused and natural disturbance factors, and quantifies erosion.

4.2.3.1 Soil and Water Quality Monitoring

Description and Justification: Monitor surface water quality, groundwater quality, and soil con-

Table 4-7. Soil and Water Quality Management Plan.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Prepare annual updates of the soil and water quality management plan.	USARAK Natural Resources	High	x	x	x	x	x
Prepare and update soil and water quality management action plan for the planning period of 2007-2011.	USARAK Natural Resources	High					x
Complete NEPA documentation for update.	USARAK Natural Resources	High					x

taminants on Fort Richardson. Groundwater, surface water, and soil monitoring will be conducted to evaluate the presence of contaminants from the impact area. Soil and water quality monitoring evaluates water quality coming onto and leaving Fort Richardson and identifies any potential contaminants leaving the impact area. Monitoring water quality is important for measuring ecosystem health on Fort Richardson. Land-based environmental degradation eventually affects water quality and aquatic ecosystems. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations, as well as to formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality monitoring is required by Public Law 86-797 (Sikes Act) every five years to implement the INRMP and both are class 1 requirements.

Groundwater monitoring is not a Army natural resources program (but is conducted by the Army environmental compliance and restoration program). It is described here to document that groundwater monitoring is conducted on Fort Richardson.

Measures of Effectiveness:

- Monitor annually surface water as it enters and leaves Fort Richardson to identify potential contaminants or potential contaminant migration.
- Monitor soils and sediments in streambeds along the Fort Richardson border annually to identify potential contaminants or potential contaminant migration.
- Participate with agencies in discussions of any contamination results.

Management Areas: Management areas for soil and water quality monitoring focus on the Eagle River Flats Impact Area, the Ship Creek watershed, and other riparian corridors. Surface water sampling locations will be concentrated in areas where these rivers and creeks enter the installation, and where they leave the installation. Soil sampling will occur in these rivers and creeks at the edge of the impact area.

Management History: Groundwater monitoring was emphasized after the post was placed on the National Priorities List in 1994. The resulting Federal Facilities Agreement has commitments from USARAK to monitor this critical resource. As a result, USARAK has installed about 100 monitoring wells over the years. This program is important to natural resources management, but it is not a natural resources program. On Fort Richardson, groundwater monitoring is a responsibility of the Army environmental compliance and restoration program, and therefore details of this program are not included within this INRMP.

Current Management: There is currently no monitoring of surface water on Fort Richardson. USARAK is developing a monitoring protocol to evaluate soil and water quality. This project is currently funded through 2002.

Groundwater monitoring will continue in 2002-2006 as part of programs implemented by the ERD. The monitoring efforts to date indicate that there are local areas of groundwater contamination at Fort Richardson (mostly in the cantonment area). This low-level contamination is of no threat to human health because this groundwater is not a source of drinking water. Groundwater levels in

Table 4-8. Soil and Water Quality Monitoring Program.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Complete development of monitoring protocol to evaluate soil and water quality to determine if there are contaminants in soil and surface water and groundwater.	USARAK Compliance	High	x	x	x		
Monitor surface water and soils for potential contaminants.	USARAK Compliance	High			x	x	x
Continue to monitor existing wells for potential groundwater contamination.	USARAK Restoration	High	x	x	x	x	x

the wells are monitored each month, and extensive chemical testing is conducted on a quarterly basis.

Proposed Management: Continue the groundwater monitoring program, and design and implement a soil and surface water quality monitoring program for Fort Richardson as outlined in Table 4-8.

Other Management Alternatives Considered and Eliminated: There are no alternatives to conducting soil and water quality monitoring. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations. Such monitoring will help formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality is an important issue for the surrounding human population. Monitoring groundwater on Fort Richardson is a requirement of CERCLA.

4.2.3.2 Planning-Level Soil Survey

Description and Justification: Conduct a planning-level soil survey on Fort Richardson. Identify and map soils, correlate soils to permafrost areas, and establish relationships among terrain components. Fort Richardson's soil survey is essential to establishing a database for planning effective management of withdrawn public lands. The planning-level soil survey is required by AR 200-3, supports compliance with the Clean Water Act, and is re-

quired to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a planning-level soil survey for Fort Richardson.
- Identify the requirement for a planning-level soil survey in the EPR.

Management History: The 1979 soil survey (SCS 1979) covers about 60 percent of Fort Richardson. Since then, field techniques have improved and the post has identified the need for a current survey covering 100 percent of the post. To that end, NRCS was contracted to conduct a soil and associated vegetation survey of the post in 1995-96. Work began in May 1995. An interim report was completed in 1997. This survey will be completed in 2001.

Current Management: There are no ongoing actions regarding the planning-level soil survey.

Proposed Management: Update the planning-level soil survey as outlined in Table 4-9.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current soils planning-level survey. Per the

Table 4-9. Planning-Level Soil Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the planning-level soil survey in 2005.	USARAK Natural Resources	High				x	

Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey must be updated every 10 years.

4.2.3.3 Planning-Level Floristic Inventory

Description and Justification: Conduct a planning-level floristic inventory of Fort Richardson. This project is the 10-year update to determine trends in vascular plant biodiversity and improve the quality of the plant species database. A complete and current floristic inventory sets the foundation on which many decisions regarding land management are based. An accurate planning-level floristic inventory is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a planning-level floristic inventory for Fort Richardson.
- Complete, maintain, and update a threatened and endangered plant species survey.
- Identify the requirement for a planning-level floristic inventory in the EPR.

Management History: A postwide floristic inventory (vascular plants and cryptogams) was done in the summer of 1994 (Lichvar et al. 1997). The post was divided into five floristic zones, which were subdivided into 39 vegetation types. A laminated specimen and traditional herbarium mount of all plant species found were provided for use as reference material, especially for the LCTA survey work.

Current Management: An ongoing part of the LCTA program is the updating of the plant collection as new species are found. Otherwise, there are

no ongoing actions regarding the planning-level floristic inventory.

Proposed Management: Update the planning-level floristic inventory as outlined in Table 4-10.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current planning-level floristic inventory. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey must be updated every 10 years.

4.2.3.4 Planning-Level Vegetation Survey

Description and Justification: Conduct a 10-year update of the planning-level vegetation survey. The vegetation survey is conducted as part of an ecological land classification. The ecological land classification synthesizes vegetation, soils, hydrological, and topographical information to map ecologically sensitive portions of the landscape, to facilitate land management, and to minimize impacts to ecosystems. The project is designed to emphasize three aspects of ecosystem management on Fort Richardson: the sensitivity and recovery of ecosystems to disturbance, an evaluation of terrain suitability for various aspects of maneuver training by the Army, and the relative value of wildlife habitats. The identification of ecologically sensitive areas on Fort Richardson and threats to these areas are critical to management of the entire installation. This project will directly support the military mission by identifying locations where special precautions should be taken during training, and thus, by default, also identifying areas where special precautions need not necessarily be taken. An accurate planning-level vegetation survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-

Table 4-10. Planning-Level Floristic Inventory.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the planning-level floristic inventory.	USARAK Natural Resources	High			x		

ED-N, 21 March 1997, this planning-level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a planning-level vegetation survey.
- Identify the requirement for a planning-level vegetation survey in the EPR.
- Identify, locate, and map any rare or sensitive vegetation communities on Fort Richardson.
- Determine sensitivity to disturbance, and the rate and direction of recovery from disturbances to vegetation communities on Fort Richardson.
- Evaluate the suitability of Fort Richardson terrain for various types of maneuver training.
- Review habitat use by selected bird and mammal species, and rank habitats in terms of use by these species.

Management History: CEMML-CSU created a vegetation map based on 1995 color infrared aerial photography. This map, focusing on lowland forested land, was completed in 1998 but was not adequately ground-truthed. This map did not delineate alpine vegetation types, and is known to be inaccurate for shrub and open-lands vegetation.

Current Management: In 2000, USARAK contracted CEMML-CSU and ABR, Inc., to create an ecological land classification for Fort Richardson. This project is expected to be completed in 2001.

Proposed Management: Update the planning-level vegetation survey as outlined in Table 4-11.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current planning-level vegetation survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey must be updated every 10 years.

4.2.3.5 Planning-Level Topography Survey

Description and Justification: Conduct a 10-year update of planning-level topography survey. An accurate planning-level topography survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a planning-level topography survey.
- Identify the requirement for a planning-level topography survey in the EPR.

Management History: A planning-level topography survey has not been completed for Fort Richardson.

Current Management: There are no ongoing survey actions to update the planning-level topography survey.

Proposed Management: Conduct a planning-level topography survey as outlined in Table 4-12.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current planning-level topography survey. Per the Sikes Act, AR 200-3, and Memorandum

Table 4-11. Planning-Level Vegetation Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the planning-level vegetation survey.	USARAK Natural Resources	High				x	

Table 4-12. Planning-Level Topography Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the planning-level topography survey.	USARAK Conservation	High				x	

DAIM-ED-N, 21 March 1997, this planning-level survey must be updated every 10 years.

4.2.3.6 Planning-Level Surface Water Survey

Description and Justification: Conduct a 10-year update of planning-level surface water survey. An accurate planning-level surface water survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a planning-level surface water survey.
- Identify the requirement for a planning-level surface water survey in the EPR.

Management History: A planning-level surface water survey has not been completed for Fort Richardson.

Current Management: There are no ongoing survey actions to update the planning-level surface water survey.

Proposed Management: Conduct a planning-level surface water survey as outlined in Table 4-13.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current planning-level surface water survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning-level survey must be updated every 10 years.

4.2.4 Watershed Management

Maintaining clean water is an important goal for Fort Richardson. USARAK plays a key role in the supply of high quality water for human use at Fort Richardson, Elmendorf AFB, and the Municipality of Anchorage. Fort Richardson maintains backup

drinking water wells, but they are not needed at this time.

Watershed management on Fort Richardson consists of surface water management, groundwater management, and erosion control. Surface water management consists of protecting creeksides, stream banks, lake shores, and immediately adjacent areas that are easily damaged. Erosion is currently not a significant threat to water quality and the institution of the LRAM program (see above) further guards against any future threats. Development is not allowed along Ship Creek, and training is restricted in the vicinity of both Ship Creek and the North Fork of Campbell Creek.

Groundwater management consists of restoration projects associated with local sources of pollution, these associated with the CERCLA “Superfund” designation. These projects are not classified as natural resources management and are not included within this INRMP.

4.2.4.1 Manage Surface Water and Groundwater Quality

Description and Justification: Managing surface and groundwater quality on Fort Richardson consists of developing best management practices designed to reduce chemical release from expended munitions in the impact areas. Activities such as moving targets away from open water and wetlands reduce the likelihood that potential releases may occur. Water quality management is required in order to stay in compliance with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Richardson. Conducting water quality management is required by Public Law 86-797 (Sikes Act) to implement the INRMP.

Measures of Effectiveness:

- Reduce the impacts of chemical release of munitions.

Table 4-13. Planning-Level Surface Water Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the planning-level surface water survey.	USARAK Conservation	High				x	

- Reduce the physical impacts of munitions on wetlands.

Management Areas: The primary management areas for water quality management at Fort Richardson are in the Eagle River Flats Impact Area, along Ship Creek, and other riparian areas.

Management History: The cleanup of Eagle River Flats has been ongoing since the 1980s. Once white phosphorus was identified as the cause of significant waterfowl mortality, measures were implemented to improve water and sediment quality in the Eagle River Flats Impact Area. The primary method has been to drain ponds to expose sediments to the air. The white phosphorus is then oxidized (combusted) and removed from the soil.

Current Management: The cleanup and remediation of the Eagle River Flats Impact Area and the restriction on using white phosphorus munitions in wetlands is ongoing.

Proposed Management: Further develop the surface and groundwater quality management program as outlined in Table 4-14. These recommendations refer to all impact areas on Fort Richardson, not just the Eagle River Flats.

Other Management Alternatives Considered and Eliminated: There may be other methods to clean up potential contaminants. USARAK will continue to consider new ideas, but most other methods of cleanup are cost prohibitive and can impact the environment in other ways.

4.2.4.2 Erosion Control and Streambank Stabilization

Description and Justification: This project will control erosion and stabilize streambanks on Fort

Richardson. This project will correct active erosion sites near sensitive areas such as streams and wetlands. Projects are intended to complement the LRAM component of ITAM, not duplicate training area repair. A Fish Habitat Permit, from ADF&G Habitat Restoration Division may be required for work conducted in or along streams and streambanks. Erosion control is required in order to stay in compliance with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Richardson. Conducting erosion control and streambank stabilization is required by Public Law 86-797 (Sikes Act) to implement the INRMP.

Measures of Effectiveness:

- Repair a minimum of 20 acres of erosion sites per year on Fort Richardson.
- Maintain or improve water quality.
- Land management operations are consistent with best management practices and ecosystem management.
- Wetlands inventories/planning-level surveys are used during the planning phase of all ground-disturbing projects.

Management Areas: Management areas for erosion control and LRAM are the same. At Fort Richardson, a rotational system of erosion control and LRAM will be used. On the North Post, erosion control and LRAM repairs will be focused on repair in Training Areas 1 and 2 in 2002, Training Areas 3 and 4 in 2003, Training Areas 5 and 6 in 2004, Training Areas 7 and 8 during 2005, and Training Areas 9 and 10 during 2006. Erosion and LRAM repair will be conducted as needed on the South Post (Figure 4-1).

Table 4-14. Surface and Groundwater Quality Management.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Evaluate moving targets away from open water.	USARAK DPTSM	High			x	x	x
Consider using green ammunition.	USARAK DPTSM	High					x
Evaluate the use of ammunition lot numbers that have a low dud rate.	USARAK DPTSM	High				x	
Continue cleanup of Eagle River Flats Impact Area.	USARAK Restoration	High	x	x	x	x	x

Management History: A number of eroding sites have been repaired on Fort Richardson. In 1998, eroding sites along Route Bravo bridge were revegetated with willow sprouts. Streambank repair on Ship Creek occurred in 1999 along a 200-foot stretch in Cottonwood Park. A diversion bar was placed in Ship Creek during 1999 to divert streamflow from an eroding bank that contains the Fort Richardson sewer line. Also in 1999, the Boy Scouts partnered with Fort Richardson to improve streambank habitat along a small section of Ship Creek.

Current Management: Installation sources of dust, runoff, silt, and erosion debris will be controlled to prevent damage to land, water resources, equipment, and facilities, including those on adjacent properties. A protective vegetative cover will be maintained over all compatible areas. Use of bio-engineered erosion control practices will be used when possible. Live plantings, root wads, coir logs, and spruce tree revetments provide erosion protection and habitat for fish and wildlife. Other materials that may be used for erosion control include gravel, fabrics, mulch, riprap, and recycled concrete and pavement that are environmentally safe and compatible with the site. When bare ground is required to accomplish mission objectives, other soil conservation measures will be used to control dust, erosion, and sedimentation. Ongoing management actions include finishing erosion control projects funded in 2001 but not completed. The Ship Creek diversion bar project will be revegetated in 2002.

Physically intensive, land-disturbing activities should be sited on the least erodible lands to minimize land maintenance expenditures and help ensure environmental compliance. The potential erodibility of sites and locations of adjacent wetlands will be identified and analyzed in all prepared plans for development, training, and other land uses. When roads are repaired, drainage problems should be corrected. However, range road maintenance at Fort Richardson, like many other Army posts, has a backlog due to budget cutbacks and higher priorities within the cantonment area. Thus, road drainage is often inadequate for proper distribution of runoff. Roads can be damaged in a short period of time, especially during spring breakup.

Therefore, it is difficult to establish long-range priorities for correcting road erosion.

Proposed Management: At Fort Richardson, a rotational system of rest, rehabilitation, erosion control, and LRAM will be implemented as part of the proposed action. Each training area on Fort Richardson will be taken out of rotation and placed off limits to military and recreational vehicle once every ten years for a period of two years. Maintenance actions for erosion control, LRAM, range maintenance, and roads and grounds maintenance will be scheduled during the first year each training area is scheduled for rest and repair, although emergency actions must take place any time, any place. Proposed actions for 2002-2006 are shown in Table 4-15.

Other Management Alternatives Considered and Eliminated: There are other potential sites for erosion control on Fort Richardson. However, less than ten percent of the total number of sites that are degraded can be fixed per year because of cost limitations. Repairing fewer than the number of site listed above can lead to poor water quality and may result in non-compliance, notices of violation, and fines. Repairing more than these sites per year would be cost prohibitive.

4.2.5 Watershed Management Responsibilities

Watershed management on Fort Richardson is the responsibility of USARAK. Within USARAK, the DPW Environmental Department has primary responsibility to conduct watershed management. DPTSM also shares responsibilities to implement soil and water quality management through the LRAM program and through best management practices in the impact areas. U.S. Army Corps of Engineers, under the Clean Water Act, is the primary regulator. The Environmental Protection Agency also has regulatory responsibility under the Safe Drinking Water Act. ADEC also has responsibility for regulating soil and water quality.

USARAK recognizes that the release of contaminants into the environment and response actions to clean up those contaminants may result in adverse impacts to natural resources addressed in

this INRMP. The Installation Restoration Program (IRP) is responsible for identifying such releases, considering risks, and assessing impacts to the environment (including impacts to endangered species, migratory birds, and biotic communities), and developing and selecting response actions when unacceptable risk to ecosystem integrity from the release is likely. The installation's natural resource management staff, in coordination with the US-FWS and Alaska Department of Fish and Game, will identify potential impacts to natural resources caused by the release of contaminants and communicate those impacts to the IRP. Installation natural resource staff will also participate, as appropriate, in the IRP decision-making process to communicate natural resource issues, review and comment on documents (e.g., Remedial Investigation, Ecological Risk Assessment), and ensure that response actions, to the maximum extent practicable, are undertaken in a manner consistent with goals set forth in the INRMP.

The IRP will notify installation natural resource management staff of contaminant releases into the environment and invite such staff to participate in the decision-making process to ensure that impacts to natural resources are identified, considered, and addressed in the response protocol.

4.3 Minerals Management

4.3.1 Minerals Management Program Goals

The goals for the minerals management program are:

- Manage the mineral resources on Fort Richardson in the best interest of the public within the framework of the military mission.
- Provide the military with a source of saleable construction materials for military construction purposes.

4.3.2 Minerals Management Program Description

The BLM identifies three categories of mineral resources on federal lands.

Locatable minerals include most metals, metallic ores, and some non-metallic minerals. If the land is open to mineral location under federal mining laws, private citizens may stake (locate) a claim, perform assessment work, and develop the resource. Valid mining claims can result in private ownership of the mineral resource. The public lands withdrawn for military use in Alaska have been closed to min-

Table 4-15. Erosion Control and Streambank Stabilization Projects.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Implement Training Area Rotation Rest and Rehabilitation Program.	USARAK DPTSM / Conservation	High	x	x	x	x	x
Repair additional erosion sites along Ship Creek.	USARAK Natural Resources	High		x			
Repair Training Area 1A, 1B, 1C, 2A, and 2B.	USARAK Natural Resources	High	x				
Repair Training Area 3 and 4.	USARAK Natural Resources	High		x			
Repair Training Area 5, 6A, and 6B.	USARAK Natural Resources				x		
Repair Training Area 7A, 7B, 8A, and 8B.	USARAK Natural Resources					x	
Repair Training Area 9A, 9B, 10A, and 10B.	USARAK Natural Resources						x
Repair Training Area 11A, 11B, 11C, 11D, 11E, 12A, 12B, 13, 14A, 14B, and 14C as needed.	USARAK Natural Resources	x	x	x	x	x	x

eral location since the 1950s. There are no valid or existing claims within the withdrawal lands (Keill pers. com. 1998; LEIS).

Leasable minerals include oil, gas, coal, geothermal resources, oil, shale, gilsonite, phosphate, potassium, and sodium. These mineral resources are leased from the federal government for a period of time and do not become the developer's property. The public lands withdrawn for military use in Alaska have been closed to mineral leasing since the 1950s. There are no valid leases on withdrawn lands.

Saleable minerals consist of construction materials such as sand, gravel, riprap, cinders, pumice, clay, limestone, and dolomite. They are purchased outright from the federal government. Saleable mate-

rials on withdrawn lands in Alaska have been used locally by the Army and other authorized agencies, but have not been extracted commercially since the lands were first withdrawn in the 1950s.

4.3.3 Minerals Management Program Responsibilities

Mineral resources on public lands withdrawn for military purposes in Alaska are managed by the BLM under federal regulations found in 45 CFR 3000. Sale and/or free use of mineral materials require NEPA review and USARAK concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and the BLM.